

CLAIMS

1. A hybrid polypeptide comprising:
 - (a) a starch-encapsulating region;
 - (b) a payload polypeptide fused to said starch-encapsulating region.
- 5 2. The hybrid polypeptide of claim 1 wherein said payload polypeptide consists of not more than three different types of amino acids selected from the group consisting of: Ala, Arg, Asn, Asp, Cys, Gln, Glu, Gly, His, Ile, Leu, Lys, Met, Phe, Pro, Ser, Thr, Trp, Tyr, and Val.
- 10 3. The hybrid polypeptide of claim 1 wherein said payload polypeptide is a biologically active polypeptide.
4. The hybrid polypeptide of claim 3 wherein said payload polypeptide is selected from the group consisting of hormones, growth factors, antibodies, peptides, polypeptides, enzyme immunoglobulins, dyes and biologically active fragments thereof.
- 15 5. The hybrid polypeptide of claim 1 wherein said starch-encapsulating region is the starch-encapsulating region of an enzyme selected from the group consisting of soluble starch synthase I, soluble starch synthase II, soluble starch synthase III, granule-bound starch synthase, branching enzyme I, branching enzyme IIa, branching enzyme IIb and glucoamylase polypeptides.
- 20 6. The hybrid polypeptide of claim 1 comprising a cleavage site between said starch-encapsulating region and said payload polypeptide.
7. A recombinant nucleic acid molecule encoding the hybrid polypeptide of claim 1.

8. The recombinant molecule of claim 7 which is a DNA molecule comprising control sequences adapted for expression of said starch-encapsulating region and said payload polypeptide in a bacterial host.
9. The recombinant molecule of claim 7 which is a DNA molecule comprising control sequences adapted for expression of said starch-encapsulating region and said payload polypeptide in a plant host.
5
10. The recombinant molecule of claim 9 wherein said control sequences are adapted for expression of said starch-encapsulating region and said payload polypeptide in a monocot.
- 10 11. The recombinant molecule of claim 9 wherein said control sequences are adapted for expression of said starch-encapsulating region and said payload polypeptide in a dicot.
12. The recombinant molecule of claim 9 wherein said control sequences are adapted for expression of said starch-encapsulating region and said payload polypeptide in an animal host.
- 15 13. An expression vector comprising the recombinant molecule of claim 7.
14. A cell transformed to comprise the recombinant molecule of claim 7, capable of expressing said DNA molecule.
15. The cell of claim 14 which is a plant cell.
16. A plant regenerated from the cell of claim 15.
- 20 17. A seed from the plant of claim 16 capable of expressing said recombinant molecule.
18. A modified starch derived from cells of claim 14 comprising said payload polypeptide.

19. A method of targeting digestion of a payload polypeptide to a selected site in the digestive system of an animal comprising feeding said animal a modified starch of claim 18 comprising said payload polypeptide in a matrix of a starch selected to be digested in the selected site in the digestive tract.

5 20. A method of producing a pure payload polypeptide from a hybrid polypeptide of claim 1 comprising:

- (a) transforming a host organism with DNA encoding said hybrid polypeptide;
- (b) allowing said hybrid polypeptide to be expressed in said host;
- (c) isolating said hybrid polypeptide from said host;

10 (d) purifying said payload polypeptide from said hybrid polypeptide.